NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

POWERLINE INFORMATION (Rev B)

NTSB Accident: WPR17FA013
Accident Date: October 25, 2016

This document contains 11 embedded images
Images courtesy Continental Motors, FAA, Google, NTSB, & Textron Aviation

A. ACCIDENT

Location:	Pittsburg, California
Date:	October 25, 2016
Aircraft:	Beechcraft A-36 'Bonanza', N364RM, Serial # E-2957
NTSB IIC:	Michael Huhn

B. EXAMINATION PARTICIPANTS:

Michael Huhn
Air Safety Investigator
National Transportation Safety Board
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C. SUMMARY

On October 25, 2016, about 1220 Pacific daylight time, a Textron Aviation (Beechcraft) A36 Bonanza, N364RM, was destroyed when it impacted powerlines and terrain in a steep descent shortly after departure from Buchanan Field Airport (CCR), Concord, California. The private pilot/owner and the certificated flight instructor (CFI) received fatal injuries. The personal flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed.

The airplane struck two high tension powerlines and then the ground. The powerlines were oriented approximately perpendicular to the flight path, and were struck about 300 feet prior to the ground impact point. About 50 fracture-separated sections of the airplane, consisting primarily of empennage and right wing fragments, were scattered below the powerlines, and in the field between the powerlines and the impact site. A post impact fire consumed most of the airplane at the impact site.

On-site and post-recovery examinations of the airplane indicated that all primary flight control surfaces were present at the time of the accident.

No evidence consistent with in-flight fire, in-flight structural failure, catastrophic engine failure, or bird strike was observed.

D. MAIN WRECKAGE SITE INFORMATION

1.0 Location

- Geographic Coordinates
  - 37º 58' 12.95" N
  - -121º 53' 45.24" W
- Site elevation was approximately 590 feet MSL
- The impact location was about 7.95 miles from the departure (south) end of KCCR runway 19R, on a bearing of 095º true (~081º magnetic) from that runway end
- The main impact site was located about 310 feet (horizontally) from the first powerline strike, on a bearing of 038º true (~024º magnetic)

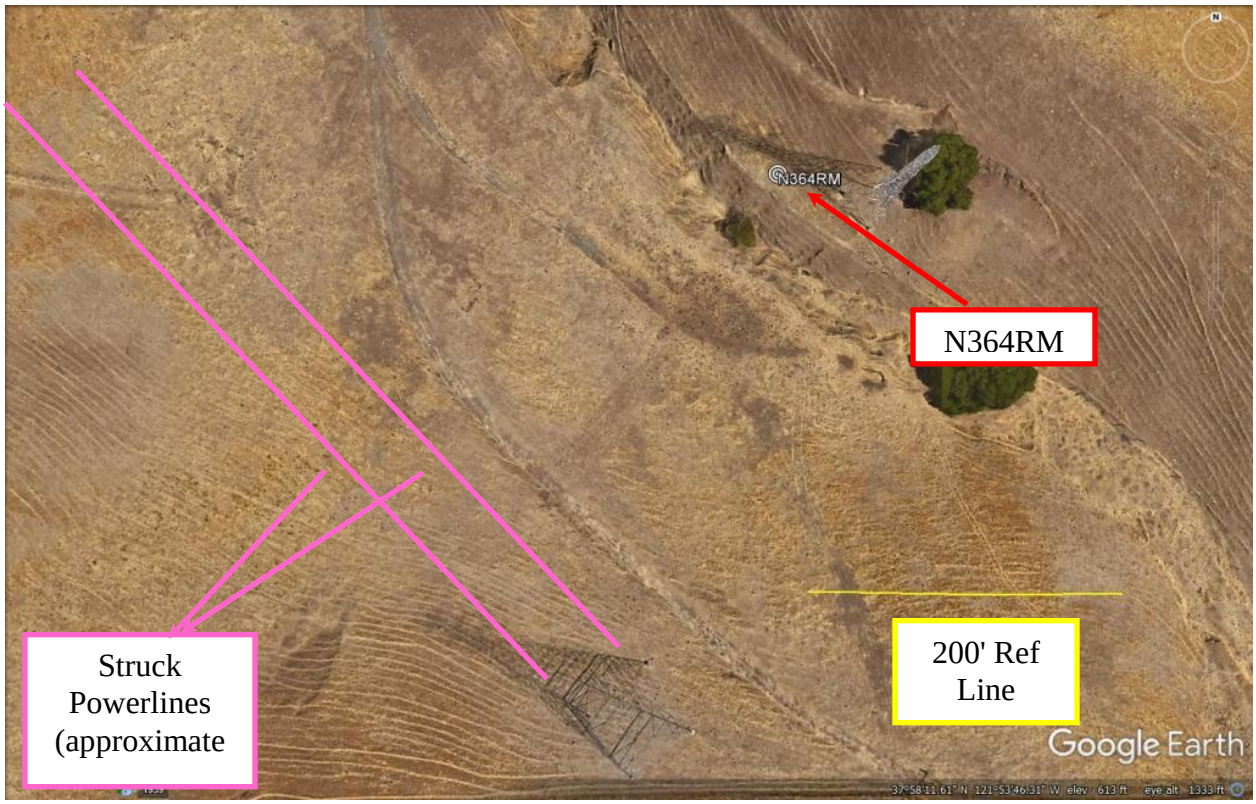

Figure 1 - Powerline and Ground Impact Orientation

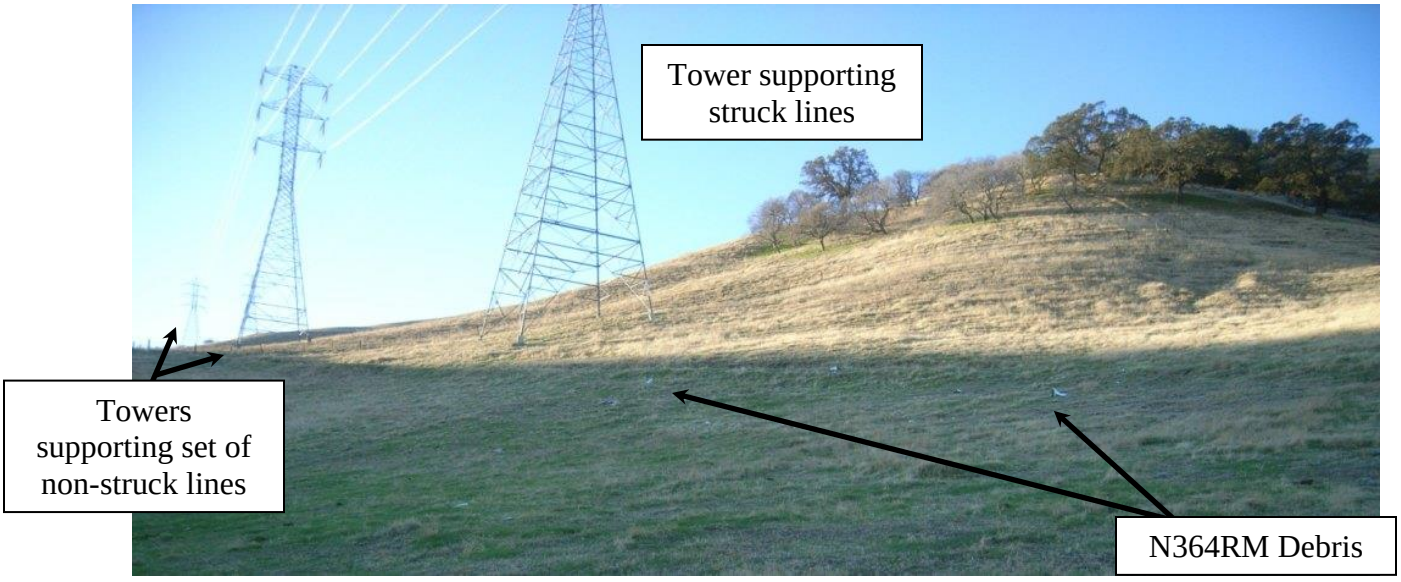

Figure 2 - Towers and Debris

Figure 3 - Powerline Strike Debris

E. POWERLINE STRIKE INFORMATION

1.0 General

The airplane struck and damaged two Pacific Gas & Electric (PG&E) high tension powerlines prior to ground impact. The powerlines were oriented approximately perpendicular to the flight path, and consisted of 6 lines total, with 3 lines on either side of the supporting tower. According to a PG&E representative, the tower was 170 feet high, the highest conductors were at a height of 165 feet (at the tower), and the vertical separation between conductors was about 16 feet. Investigators estimated the horizontal separation of the conductors to be about 40 feet. The airplane struck the wires about 130 feet from the tower; cable catenary sag was estimated to be about 5 feet at the struck location. The airplane first struck the middle line of the PG&E Pittsburg-San Mateo 230kVa array, and then the lower line of the PG&E Pittsburg-East Shore 230kVa array. Although neither line was severed, both were damaged. A second, similar array of 6 more powerlines, was situated just northeast of, and parallel to, the struck set. None of those second 6 powerlines were struck.

PG&E personnel reported that the two struck powerlines were identified as the "954-ACSS" type. The lines were composed of 7 steel support strands, wrapped with 54 aluminum conductor strands. Publicly-available powerline specifications indicated that the steel core was about 0.4" in diameter, and the overall line diameter was about 1.2". The aluminum conductor strands were approximately 0.13" in diameter. Depending on the specific version, the "rated strength" was cited to range from 26,000 to 32,300 lbs.

The first struck powerline exhibited three discontinuous/separate damage sites, over a span of approximately 25 feet. The second struck powerline exhibited three discontinuous/separate damage sites, over a span of approximately 12 feet.

Figure 4 - Damaged Powerlines

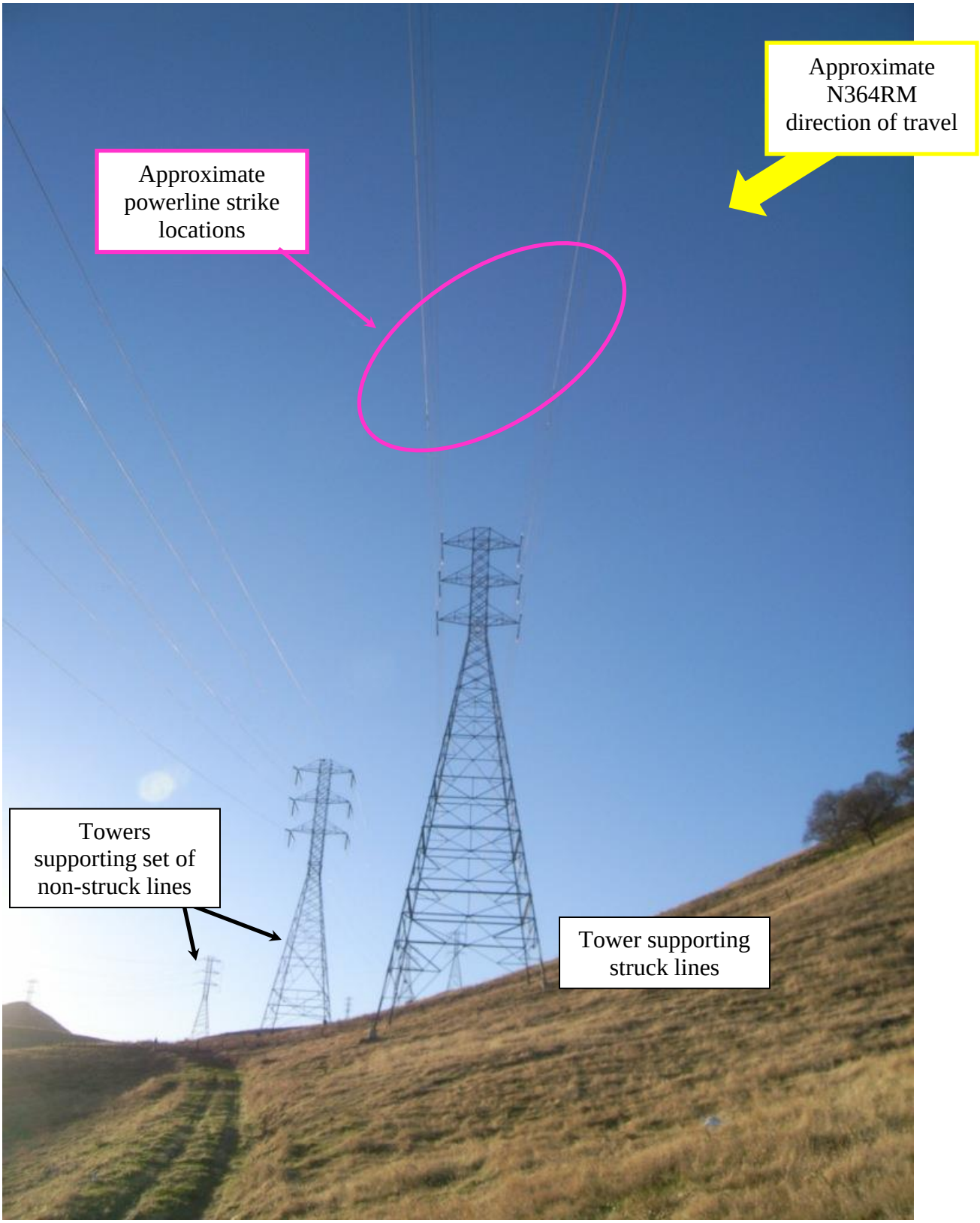

Figure 5 - Powerline Arrangement

Figure 6 - Struck Powerline with Conductor Damage

Figure 7 - Significant Conductor Damage

2.0 First Struck Powerline

Figure 8 - Powerline After Removal (note damage)

Figure 9 - Powerline After Removal (note damage)

3.0 Second Struck Powerline

Figure 10 - Powerline with Captive N364RM Component

Figure 11 - Powerline with Captive N364RM Component (tip tank rib)

F. TRAJECTORY CALCULATIONS

1.0 First Powerline to Second Powerline

- Approximate Vertical Separation = 16 feet
- Approximate Lateral Separation = 40 feet
- Trajectory depression angle
    - ArcTan 16/40 = 21º
    - Note this does not account for airplane dimensions or attitude, which can introduce significant variability into the results

2.0 Powerlines to Ground

- Average powerline height = ((165 - 5 - 16) + (165 - 5 - 32)) / 2 = 136' agl
- Terrain elevation under powerline strikes = 660 ft msl
- Average powerline height = 136 + 660 = 796 ft msl
- Terrain elevation of main wreckage (ground impact location) = 590 ft msl
- Horizontal separation of two locations = 310 feet
- Trajectory depression angle
    - ArcTan 206/310 = 34º